

CLAIMS

1. Use of a rare earth metal cobalt oxide having the perovskite crystal structure as a catalyst in a hydrocarbon fuel processor for converting or reforming a hydrocarbon fuel into a simple fuel most especially hydrogen.
2. Use according to Claim 1 in which the catalyst further includes a noble metal or noble metal oxide.
3. Use according to Claim 1 or Claim 2 in which the catalyst comprises a solid solution having the perovskite crystal structure of the rare earth metal cobalt oxide and an alkaline earth metal/cobalt oxide.
4. Use according to any preceding claim in which the rare earth metal is lanthanum.
5. Use according to any one of Claims 2 to 4 in which the noble metal or noble metal oxide is ruthenium or ruthenium oxide.
6. Use according to any one of Claims 2 to 4 in which the noble metal or noble metal oxide is platinum or platinum oxide.
7. Use according to Claim 3 or to any one of Claims 4 to 6 when dependent on Claim 3 wherein the alkaline earth is calcium, strontium or barium.

8. Use according to Claim 3 or any one of Claims 4 to 7 when dependent on Claim 3 in which the catalyst further includes the alkaline earth metal cobalt oxide in a proportion up to 50%.
9. Use according to Claim 2 or any one of Claims 3 to 8 when dependent on Claim 2 in which the noble metal or noble metal oxide is included up to 2 mole %.
10. Use according to any preceding claim in which the catalyst undergoes thermal decomposition such that its surface becomes coated with catalytically active lanthium oxide, hydrated lanthium oxide and cobalt metal particles.
11. A hydrocarbon fuel processor catalyst characterised by comprising a rare earth metal cobalt oxide having the perovskite crystal structure.
12. A catalyst according to Claim 11 and further including a noble metal or noble metal oxide.
13. A catalyst according to Claim 11 or Claim 12, which comprises a solid solution having the perovskite crystal structure of the rare earth metal cobalt oxide and an alkaline earth metal cobalt oxide.
14. A catalyst according to any one of Claims 11 to 13 in which the rare earth metal is lanthanum.

15. A catalyst according to any one of Claims 12 to 14 in which the noble metal or noble metal oxide is ruthenium or ruthenium oxide.
16. A catalyst according to any one of Claims 12 to 14 in which the noble metal or noble metal oxide is platinum or platinum oxide.
17. A catalyst according to Claim 13 or to any one of Claims 14 to 16 when dependent on Claim 13 in which the alkaline earth is calcium, strontium or barium.
18. A catalyst according to Claim 13 or any one of Claims 14 to 17 when dependent on Claim 13 and including the alkaline earth metal cobalt oxide in a proportion up to 50%.
19. A catalyst according to Claim 12 or any one of Claims 13 to 18 when dependent on Claim 12 and comprising including, the noble metal or noble metal oxide up to 2 mole %.
20. A hydrocarbon fuel processor for converting a hydrocarbon fuel to hydrogen incorporating a catalyst according to any one on Claims 11 to 19.

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